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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Christophe Bureau

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EXAMINER

CLARK, GREGORY D

ART UNIT

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1794

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/518,923	<b>Applicant(s)</b> BUREAU ET AL.	
	<b>Examiner</b> GREGORY CLARK	<b>Art Unit</b> 1794	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 1-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

The examiner acknowledges receiving the applicant's amended claims dated 05/20/2009. Claims: 1-7 and 22 (previously presented), 8-21 (cancelled) and 22-30 (new).

#### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/30/2009 has been entered.

#### ***Election/Restrictions***

2. Newly submitted claims 1-24 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

**Group I, claim (s) 1-7 and 22**, drawn to a method for bonding objects to conducting or semiconductive solid support surfaces by means of surface chemical reactions.

**Group II, claim(s) 23-30, 17-20**, drawn to a solid support comprising a functionalized electrically conductor or semiconductor surface.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The groups contain a common technical feature that of a conducting or semiconducting surface functionalized with electrografted polymeric species. The common technical feature does not provide a contribution over the prior art because the common technical feature is disclosed in WO 02/098926 to Bertrand who teaches a process for depositing by electro-grafting a strong adherent polymer coating on an electrically conductive surface comprising an electrochemical grafting at the surface of an active monomer (comprising an anchoring group for attachment of a molecule having at least one complementary reactive group) (Page 5, lines 8-11).

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 1-7 and 22 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claims 23-30 of the originally elected statutory product class (08/19/2008) of Group I is being examined.

Should applicant traverse on the ground that the inventions or species are not patentably distinct, applicant should submit evidence or identify such evidence now of

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record showing the inventions or species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C.103 (a) of the other invention.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 23-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bertrand (WO 2002/098926) in view of Guiseppi-Elie (5,766,934).**

5. **Regarding Claim 23**, Bertrand teaches electro-grafting a strong adherent polymer coating on an electrically conductive surface comprising an electrochemical grafting at the surface of an active monomer (comprising a reactive functional group for attachment of a molecule having at least one complementary reactive group) (Page 5, lines 8-11). Bertrand does not teach electrografting resulting in 90% of the total

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functional groups being accessible and that the density of accessible functional groups of interest is between  $10^4/\text{micron}^2$  and  $10^{10}/\text{micron}^2$ .

The examiner notes that the applicant indicates in the specification that the accessible groups of interest of the coating used will be sufficient in number to adapt as well as possible to the steric constraints, and more generally to the topology, of the object that it is desired to attach to this coating.

Bertrand does not specifically mention 90% accessibility of functional groups or the density of accessible functional groups of interest is between  $10^4/\text{micron}^2$  and  $10^{10}/\text{micron}^2$ .

It would have been obvious to one having ordinary skill in the art at the time of the invention to have carried out an electrografting process by adjusting the level of the "functional group containing species" and the density of such species to account for the expected steric constraints (crowding of the functional groups limit reactivity) to produce the desired percentage of functional group accessibility and density.

It has been held that discovering an optimum value (accessibility and density of functional groups) of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Bertrand further teaches electrografted coatings of polymers such as polyhydroxyethylacrylate can be deposited on the conducting substrates with a strong adhesion and an increased and tunable thickness (controllable thickness) (page 9, lines 18-20). Bertrand fails to teach a density of  $10^4/\text{micron}^2$  to  $10^{10}/\text{micron}^2$  for accessible functional groups.

Guisseppi-Elie teaches electropolymerization providing a unique and convenient method for precise control of polymer film thickness by control of the electropolymerization charge density (column 2, lines 46-55).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine Bertrand with Guisseppi-Elie because Guisseppi-Elie provides a method for precise control of polymer film thickness which leads to convenient surface functionalization by subsequent blending with other molecules such as polypeptides. (Column 2, lines 57-61).

Moreover, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the density for the intended application, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2nd 272,205 USPQ 215 (CCPA 1980).

6. **Regarding Claim 24**, Bertrand teaches the use of monomers with a reactive functional group toward nucleophilic compounds. The reactive functional group may be for example a succinimidyl group particularly reactive towards amines or epoxy, a vinyl, an allyl, an aryl, a chloride group or a combination of them (page 13, lines 1-3). When the reactive functional group is part of a preformed polymer, the monomer becomes a macromonomer bearing at least one activated vinylic pendant group (acrylic or methacrylic function) which allows formation of new primer by one-step electrografting of a reactive polymer called macromonomer (page 5, line 28-32).

7. **Regarding Claim 25**, Bertrand teaches grafted activated vinyl monomers can undergo controlled or uncontrolled ring opening polymerization (referred to by the applicant as molecules that are cleavable by nucleophilic attack) (page 8, lines 23-31).

8. **Regarding Claim 26**, Bertrand teaches electro-reactive species in the form of acrylates and methacrylates containing an anchoring group (labeled as the X group in diagram page 5) that can be electrografted to conductive surfaces (page 5, lines 7-31). Bertrand mentions glycidyl methacrylate as one of the monomers used in electrografting (page 9, line 9).

9. **Regarding Claim 27**, Bertrand teaches the use of lactones and lactides such as (ε-caprolactone), and functional caprolactones such as γ-bromo- ε-caprolactone, or lactide such as D, L-Lactide or any other polymerizable cyclic monomer such as cyclic anhydride (page 9, lines 1-4). The examiner notes that these materials are cleavable by nucleophilic attack.

10. **Regarding Claim 27**, Bertrand teaches the use of lactones and lactides such as (ε-caprolactone), and functional caprolactones such as γ-bromo- ε-caprolactone, or lactide such as D, L-Lactide or any other polymerizable cyclic monomer such as cyclic anhydride (page 9, lines 1-4). The examiner notes that these materials are cleavable by nucleophilic attack.



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11. **Regarding Claim 28**, Bertrand teaches grafting a molecule or macromolecule with a complementary functional group to the surface via polycondensation or polyaddition which include: proteins, enzymes, oligonucleotides, drugs, dyes, or small organic molecules of particular interest like electroactive molecules (aminoferrocene), vitamin (biotine), and ligands (page 13, lines 10-18).

12. **Regarding Claim 29**, Bertrand teaches electrografting reactions on steel, stainless steel, Inox316L, tantalum, titanium, nitinol carbon, ITO glass, transition metal (Fe, Ni, Cu, Au, and Ag), metal doped polymers (page 6, lines 30-32).

13. **Regarding Claims 30**, Betrand teaches electrografied acrylates or methacrylates (organic precursors) containing an anchoring group for attachment of a molecule having at least one complementary reactive group (page 5, lines 20-26). The process allows the grafting onto the initial coating (adhesion primer) by compounds like functional polymers such as, protein, peptide, oligonucleotide (defined as DNA chips, page 4, line 28), dyes, drugs, and anti-bacterian compounds (page 6, lines 9-11).

14.

### ***Response to Amendment***

Claims 1-7 and 22 are withdrawn from consideration as being directed to a non-elected invention. Claims 23-30 of the originally elected statutory product class have been examined in the current office action.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY CLARK whose telephone number is (571)270-7087. The examiner can normally be reached on M-Th 7:00 AM to 5 PM Alternating Fri 7:30 AM to 4 PM and Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1794

/GREGORY CLARK/GDC/  
Examiner, Art Unit 1794

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